What is Claimed is:

1. An apparatus comprising first and second substrates, each of the substrates having a surface containing a plurality of open, nanoscale channels disposed therein, the surfaces bonded together such that each of the channels of the first substrate is in fluid communication with at least two of the channels of the second substrate and is misaligned relative to the channels of the second substrate.

2. The apparatus of claim 1, wherein the channels have equivalent and constant cross-sectional diameters within a range of about 1 square nanometers (nm^2) to about 10,000 nm^2.

3. The apparatus of claim 1, wherein the channels have equivalent and variable cross-sectional diameters within a range of about 1 nm^2 to about 10,000 nm^2.

4. The apparatus of claim 1, wherein each of said surfaces has at least about 1000 channels to about ten million channels disposed therein.

5. The apparatus of claim 1, wherein each of the channels traverses an entire length of the surface.

6. The apparatus of claim 1, wherein the channels of the first substrate are parallel to each other, and the channels of the second substrate are parallel to each other.

7. The apparatus of claim 1, wherein the channels of the first substrate are spaced equidistant from each other, and the channels of the second substrate are spaced equidistant from each other.

8. The apparatus of claim 1, wherein the first and second substrates comprise one or more materials selected from the group consisting of quartz, silica, silicon, porous silicon, polysilicon, and porous polysilicon.

9. The apparatus of claim 8, wherein the first and second substrates comprise quartz.

10. The apparatus of claim 1, further comprising third and fourth substrates bonded to edge surfaces of each of the first and second substrates, the edge surfaces being substantially perpendicular to the channels.

11. The apparatus of claim 10, wherein the third and fourth substrates comprise one or more materials selected from the group consisting of quartz, silica, silicon, porous silicon, polysilicon, porous polysilicon, and silicon oxynitride.

12. The apparatus of claim **11**, wherein the third and fourth substrates comprise silicon oxynitride.

13. The apparatus of claim **1**, wherein the channels of the first substrate are misaligned relative to the channels of the second substrate by an angle of about 0.05° to about 45°, the angle defined by an intersection of a channel of the first substrate and a channel of the second substrate.

14. A method comprising:

(a) passing a fluid comprising particles having different effective molecular diameters through a plurality of open, nanoscale channels disposed in surfaces of substrates, the substrates bonded together such that each of the channels of a first substrate is in fluid communication with at least two of the channels of a second substrate and is misaligned relative to the channels of the second substrate;

(b) obtaining a plurality of fractions of the passed fluid, each of the fractions comprising a major portion comprising particles having similar size and shape and substantially free of particles having larger size and shape.

15. The method of claim **14**, wherein the channels have equivalent and constant cross-sectional diameters within a range of about 1 square nanometers (nm^2) to about 10,000 nm^2.

16. The method of claim **14**, wherein the channels have equivalent and variable cross-sectional diameters within a range of about 1 nm^2 to about 10,000 nm^2.

17. The method of claim **14**, wherein each of said surfaces has at least about 1000 channels to about ten million channels disposed therein.

18. The method of claim **14**, wherein each of the channels traverses an entire length of the surface.

19. The method of claim **14**, wherein the channels of the first substrate are parallel to each other, and the channels of the second substrate are parallel to each other.

20. The method of claim **14**, wherein the channels of the first substrate are spaced equidistant from each other, and the channels of the second substrate are spaced equidistant from each other.

21. The method of claim **14**, wherein the first and second substrates comprise one or more materials selected from the group consisting of quartz, silica, silicon, porous silicon, polysilicon, and porous polysilicon.

22. The method of claim **21**, wherein the first and second substrates comprise quartz.

23. The method of claim **14**, further comprising third and fourth substrates bonded to edge surfaces of each of the first and second substrates, the edge surfaces being substantially perpendicular to the channels.

24. The method of claim **23**, wherein the third and fourth substrates comprise one or more materials selected from the group consisting of quartz, silica, silicon, porous silicon, polysilicon, porous polysilicon, and silicon oxynitride.

25. The method of claim **24**, wherein the third and fourth substrates comprise silicon oxynitride.

26. The method of claim **14**, wherein the channels of the first substrate are misaligned relative to the channels of the second substrate by an angle of about 0.05° to about 45°, the angle defined by an intersection of a channel of the first substrate and a channel of the second substrate.

27. A method comprising:

(a) patterning an array of open, nanoscale channels on a major planar surface of each of a first substrate and a second substrate;

(b) bonding the channeled surfaces together such that each of the channels of the first substrate is in fluid communication with at least two of the channels of the second substrate, and such that the each of the channels of the first substrate is misaligned relative to the channels of the second substrate; and,

(c) bonding one or more cap substrates to one more edge surfaces of each of the bonded first and second substrates, the edge surfaces being substantially perpendicular to the channels.

28. The method of claim **27**, wherein said patterning comprises a lithography method selected from the group consisting of interferometric lithography, immersion interferometric lithography, electron beam lithography, scanning probe lithography, nanoimprint, extreme ultraviolet lithography, and X-ray lithography.

29. The method of claim **28**, wherein said patterning comprises interferometric lithography.

30. The method of claim **27**, wherein the channeled surfaces are bonded together by flip-chip bonding.

31. The method of claim **27**, wherein the channeled surfaces are bonded together by anodic bonding.